

✓  
On page 69, line 15, following "control and data over Ethernet", please delete "32" and insert therefor - - 41 - -.

In the Drawings

Please amend Figures 9b, 16c, 17, 18, 19, 20, 23, 26, 35, and 55 as shown in red in the attached drawings.

**REMARKS**

Applicants respectfully request that the Examiner enter the amendments set forth above prior to examining the above-referenced application.

Applicant amend the specification and Figures 9b, 16c, 17, 18, 19, 20, 23, 26, 35, and 55 to correct typographical errors. Specifically, reference numeral 32 is a duplicate. Therefore Applicants replace reference numeral 32 with reference numeral 41 in both the specification and Figures 9b, 16c, 17, 18, 19, 20, 23, and 26. Applicants add reference numeral 41 to the connection between NMS 60 and the network device 540 in Figure 35. Reference numeral 838 is added to the input marked "Alt. Input from other EX CTS" in Figure 55. Both reference numeral 41 and reference numeral 838 are referred to in the specification and used in other figures to designate the same part of the invention. No new matter is added by these amendments.

In addition, Applicants amend Figure 55 to remove an extraneous line section to indicate the correct connection of the *output* 770 to the Alt. *output* to other EX CTS. Support for this amendment can be found throughout the specification, for example, on page 193, lines 14-17. In particular, the specification recites that "the output 770 (marked "Alt. Output to other EX CTS") of timing module 76 may be provided to the other EX CTS and received as

Application No.: 09/653,700  
Filed: August 31, 2000  
Group Art Unit: 2862

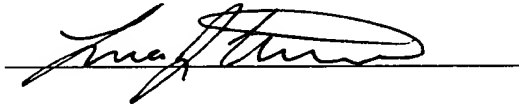
input 838 (marked "Alt. Input from other EX CTS"). Thus, no new matter is added by this amendment.

For the Examiner's convenience, Applicants enclose a copy of pages 68 and 69 of the specification in which the above corrections are indicated in red.

The Examiner is urged to telephone the undersigned Attorney for Applicant in the event that such communication is deemed to expedite prosecution of this matter.

Respectfully submitted,

Date: 12/18/00



Lisa J. Michaud  
Reg. No. 44,238  
Attorney for Applicant(s)

Nutter, McClennen & Fish, LLP  
One International Place  
Boston, MA 02110-2699  
Tel: (617)439-2550  
Fax: (617)310-9550

corresponding to the particular devices on each card. Referring to Fig. 8, slave MCDs 39a-39n search PMD file 48 in memory 40 on central processor 12 for a match with their line card type and version number. Just as the master MCD 36 found the name of the MKI executable file for each line card in the PMD file, each slave MCD 39a-39n reads the PMD file to learn the names of all the device driver executable files associated with each line card type and version. The slave MCDs provide these names to the slave SRMs on their boards. Slave SRMs 37a-37n then download and execute the device driver executable files (DD.exe) 56a-56n from memory 40. As one example, one port device driver 43a-43d may be started for each port 44a-44d on line card 16a. The port driver and port are linked together through the assigned port PID number.

In order to understand the significance of the PMD file (i.e., metadata), note that the MCD software does not have knowledge of board types built into it. Instead, the MCD parameterizes its operations on a particular board by looking up the card type and version number in the PMD file and acting accordingly. Consequently, the MCD software does not need to be modified, rebuilt, tested and distributed with new hardware. The changes required in the software system infrastructure to support new hardware are simpler modify logical model 280 (Fig. 3a) to include: a new entry in the PMD file (or a new PMD file) and, where necessary, new device drivers and applications. Because the MCD software, which resides in the kernel, will not need to be modified, the new applications and device drivers and the new DDL files (reflecting the new PMD file) for the configuration database and NMS database are downloaded and upgraded (as described below) without re-booting the computer system.

#### Network Management System (NMS):

Referring to Fig. 9a, as described above, a user / network administrator of computer system 10 works with network management system (NMS) software 60 to configure computer system 10. In the embodiment described below, NMS 60 runs on a personal computer or workstation 62 and communicates with central processor 12 over Ethernet network <sup>41</sup>32 (out-of-band). Instead, the NMS may communicate with central processor 12 over data path 34 (Fig. 1, in-band). Alternatively (or in addition as a back-up

communication port), a user may communicate with computer system 10 through a console interface / terminal (840, Fig. 2a) connected to a serial line 66 connecting to the data or control path using a command line interface (CLI) protocol. Instead, NMS 60 could run directly on computer system 10 provided computer system 10 has an input mechanism for the user.

During installation, an NMS database 61 is established on, for example, work-station 62 using a DDL executable file corresponding to the NMS database. The DDL file may be downloaded from persistent storage 21 in computer system 10 or supplied separately with other NMS programs as part of an NMS installation kit. The NMS database mirrors the configuration database through an active query feature (described below). In one embodiment, the NMS database is an Oracle database from Oracle Corporation in Boston, Massachusetts.

- 16 The NMS and central processor 12 pass control and data over Ethernet <sup>41</sup>~~32~~ using, for example, the Java Database Connectivity (JDBC) protocol. Use of the JDBC protocol allows the NMS to communicate with the configuration database in the same manner that it communicates with its own internal storage mechanisms, including the NMS database. Changes made to the configuration database are passed to the NMS database to ensure that both databases store the same data. This synchronization process is much more efficient, less error-prone and timely than older methods that require the NMS to periodically poll the network device to determine whether configuration changes have been made. In these systems, NMS polling is unnecessary and wasteful if the configuration has not been changed. Additionally, if a configuration change is made through some other means, for example, a command line interface, and not through the NMS, the NMS will not be updated until the next poll, and if the network device crashes prior to the NMS poll, then the configuration change will be lost. In computer system 10, however, command line interface changes made to configuration database 42 are passed immediately to the NMS database through the active query feature ensuring that the NMS, through both the configuration database and NMS database, is immediately aware of any configuration changes.

FIG. 9b

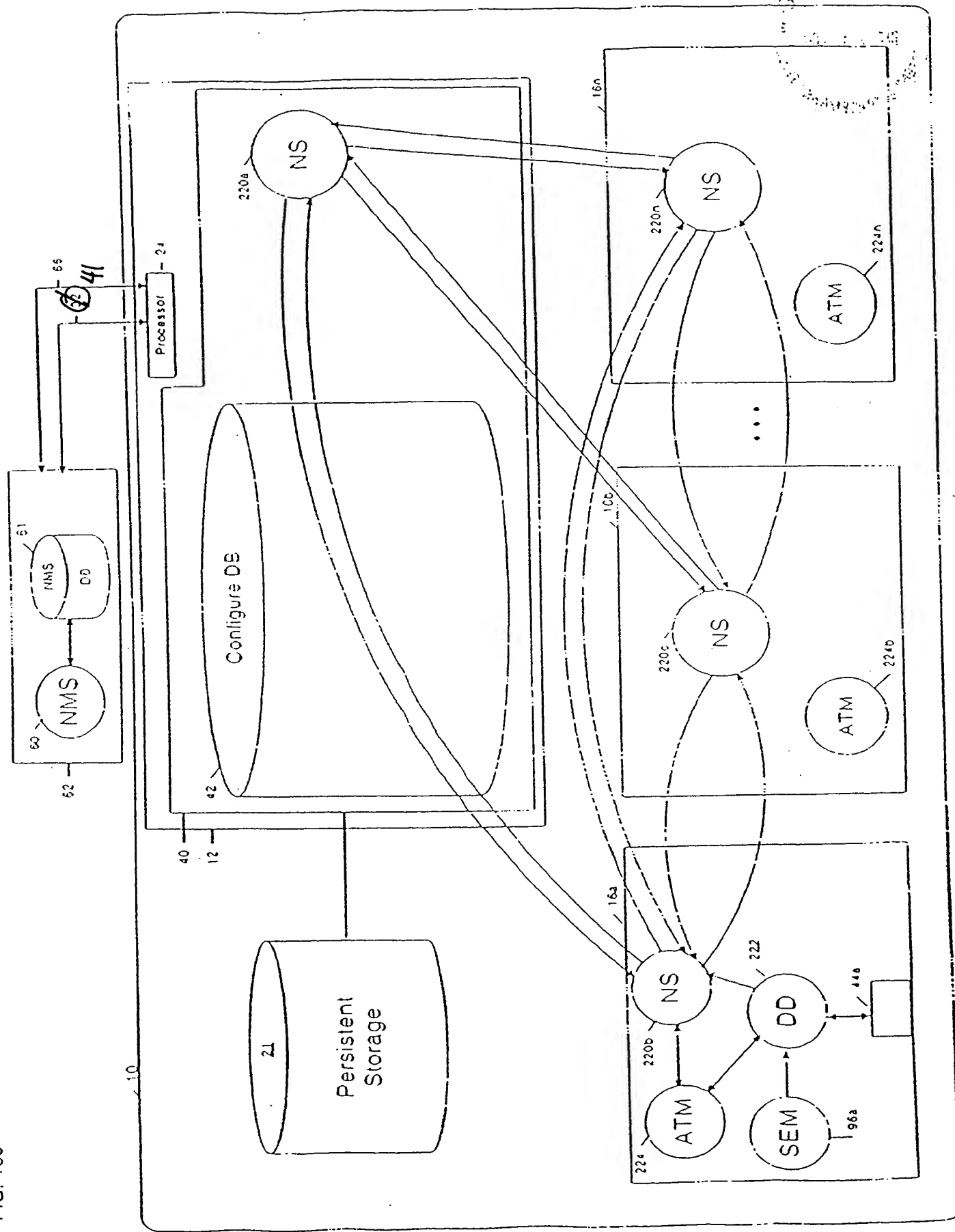


FIG. 17

FIG. 17 is a block diagram illustrating a network management system architecture. The system includes a main processing unit (10) and a separate network element (16a).

The main processing unit (10) contains a Processor (24) connected to a Configure DB (42) and an ATM Interface Table (114). The Configure DB (42) is linked to a SET (76). A Persistent Storage (21) is connected to the main unit. External components include NMS (60) and NMS (61) connected to a switch (41) and a Processor (24).

The network element (16a) shows a detailed view of the ATM Interface Table (114) with entries for ATM G3 (112), ATM IF 1 (118), ATM IF 12 (116), SE 10 (104), SE 5 (105), SE 6 (106), and NS (102). It also shows a connection to a switch (440) and a network (100).

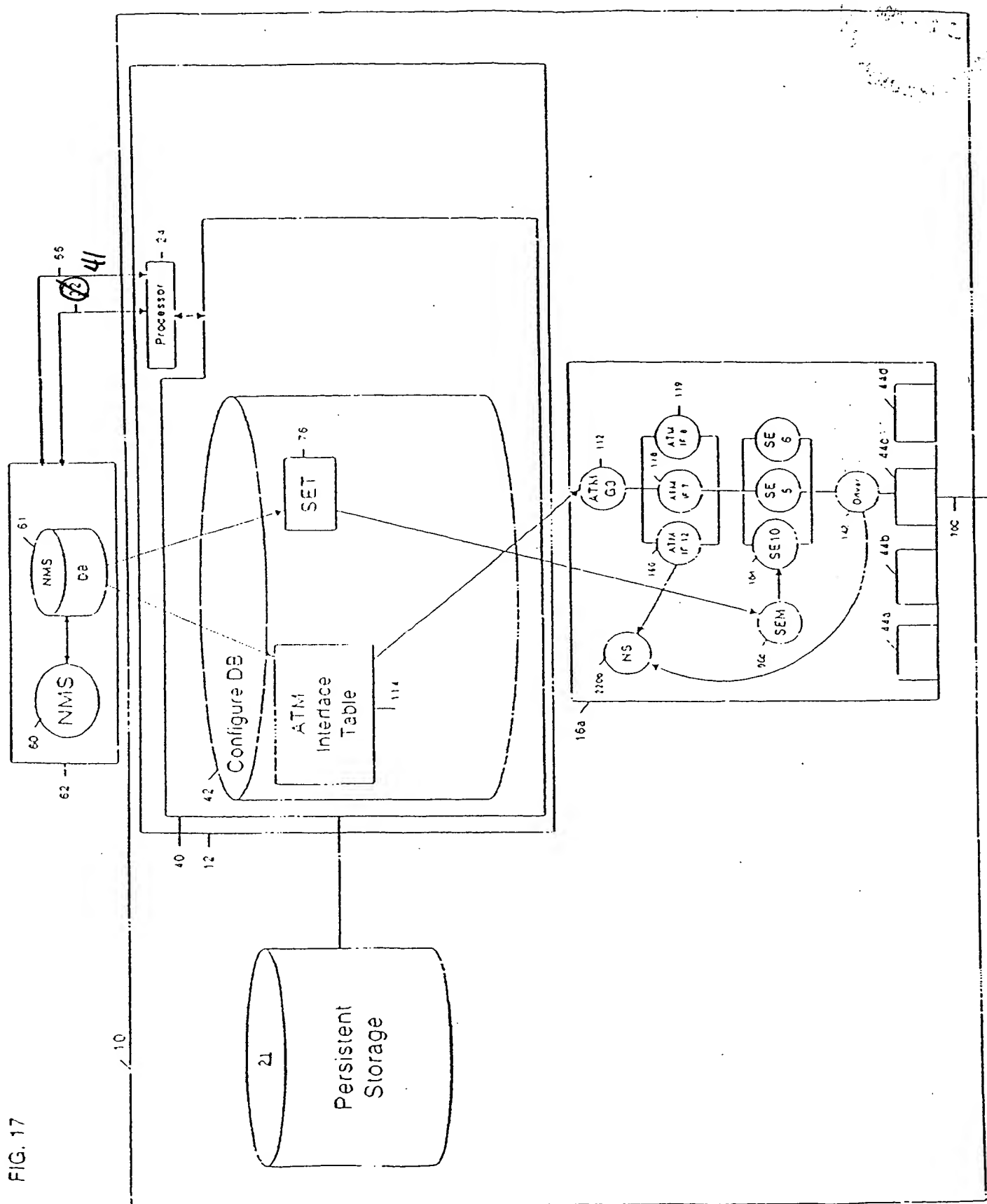


FIG. 18

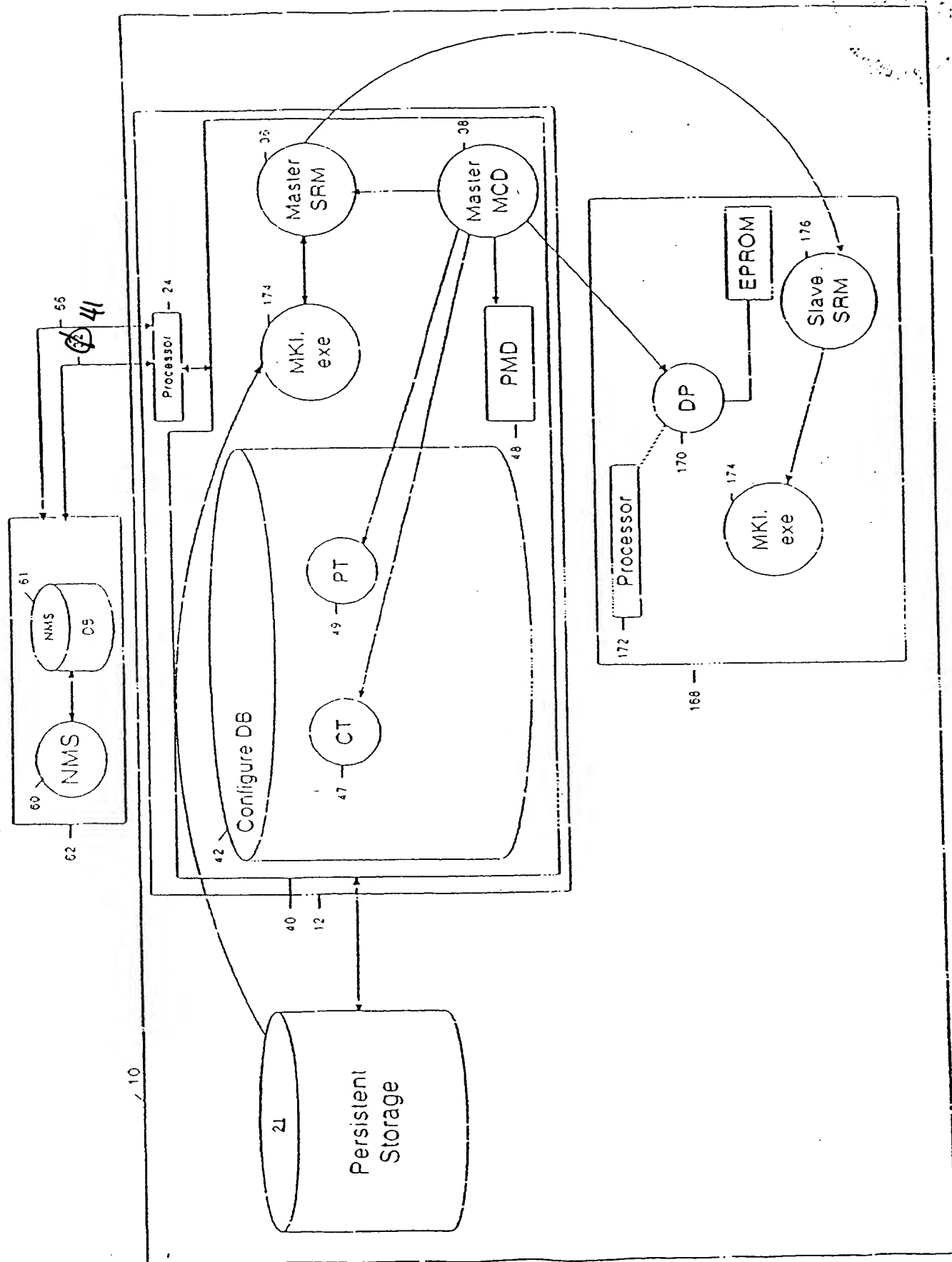




FIG. 19

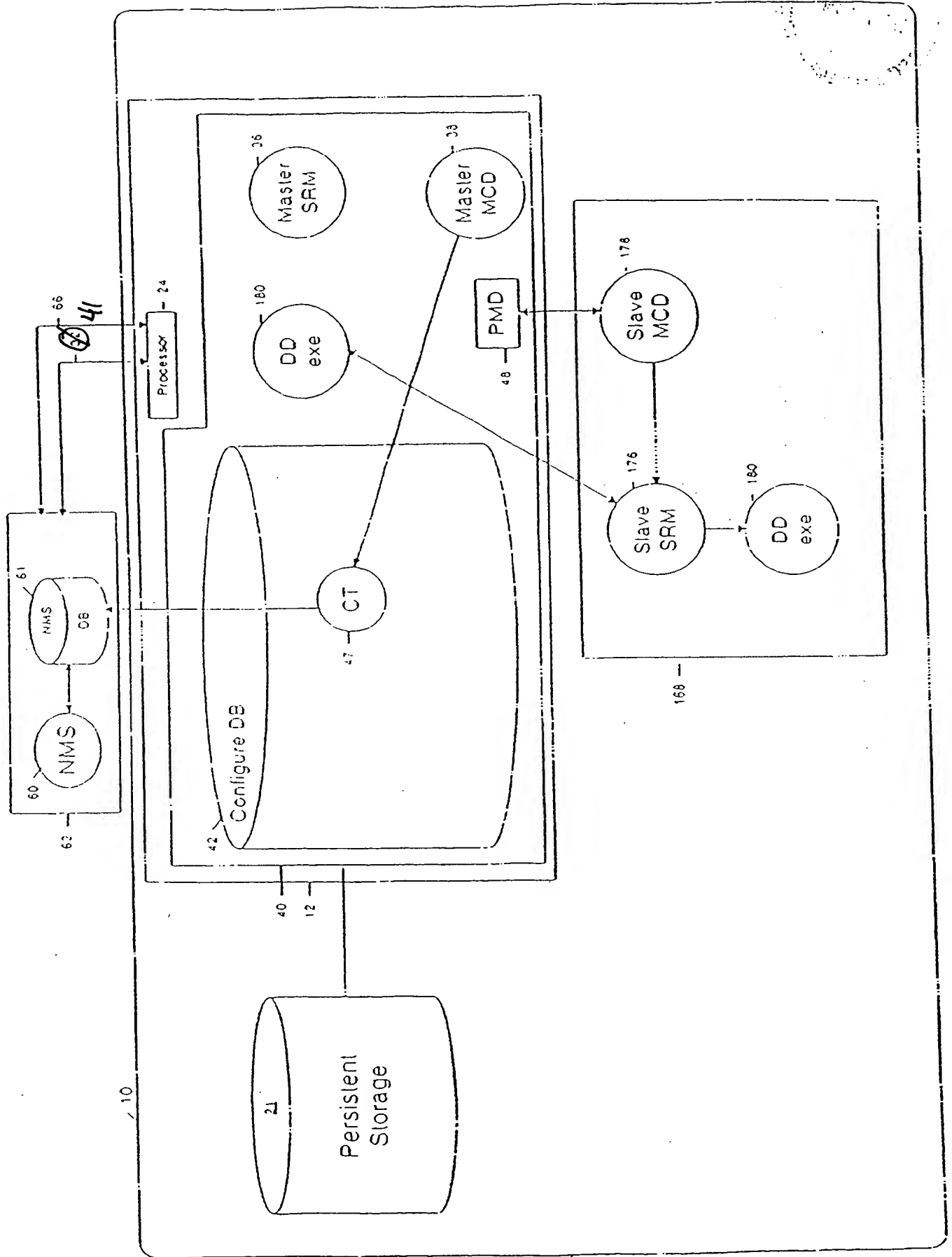
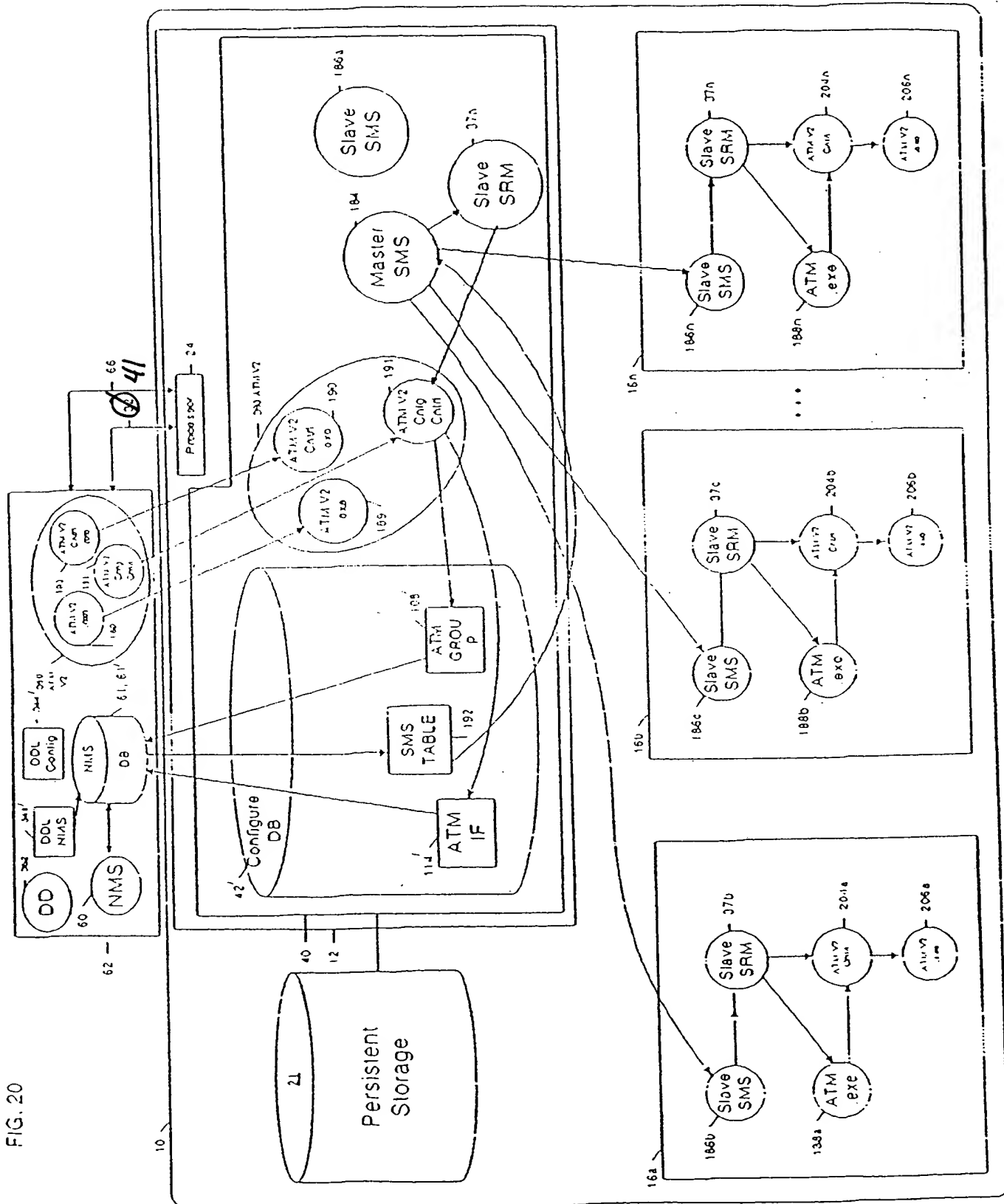


FIG. 20



The diagram illustrates the system architecture, showing the flow of data and control between various components. The main system is enclosed in a large rectangle, with a sub-system labeled 16c shown in a separate box on the right.

**Main System Components:**

- Persistent Storage (21):** A cylinder representing long-term data storage, connected to the main system via lines 40 and 12.
- Configure DB (42):** A database component that receives data from the Persistent Storage and provides data to the SMS TABLE, PMD, and CT.
- SMS TABLE (192):** A table component that receives data from the Configure DB and provides data to the Master SMS and DD.exe.
- PMD (48):** A component that receives data from the Configure DB and provides data to the Master SMS.
- CT (47):** A component that receives data from the Configure DB and provides data to the Master SMS.
- Master SMS (194):** The central SMS component that receives data from the SMS TABLE, PMD, and CT, and provides data to the Slave SMS and DD.exe.
- DD.exe (362):** A component that receives data from the Master SMS and provides data to the Processor.
- Processor (24):** The central processing unit that receives data from DD.exe and provides data to the NMS and DD.exe.
- NMS (60):** A component that receives data from the Processor and provides data to the DD.exe.
- DD.exe (362):** A component that receives data from the Processor and provides data to the NMS.

**Sub-system 16c Components:**

- Slave SMS (1861):** A component that receives data from the Master SMS and provides data to the DD.exe.
- Slave SRM (371):** A component that receives data from the Master SMS and provides data to the DD.exe.
- DD.exe (212):** A component that receives data from the Slave SMS and Slave SRM, and provides data to the DD.exe.
- DD.exe (363):** A component that receives data from the DD.exe (212) and provides data to the DD.exe.

**Handwritten Annotations:**

- A handwritten "41" is written next to the Processor (24).
- A handwritten "65" is written next to the DD.exe (362) component.

## Persistent Storage

FIG. 26

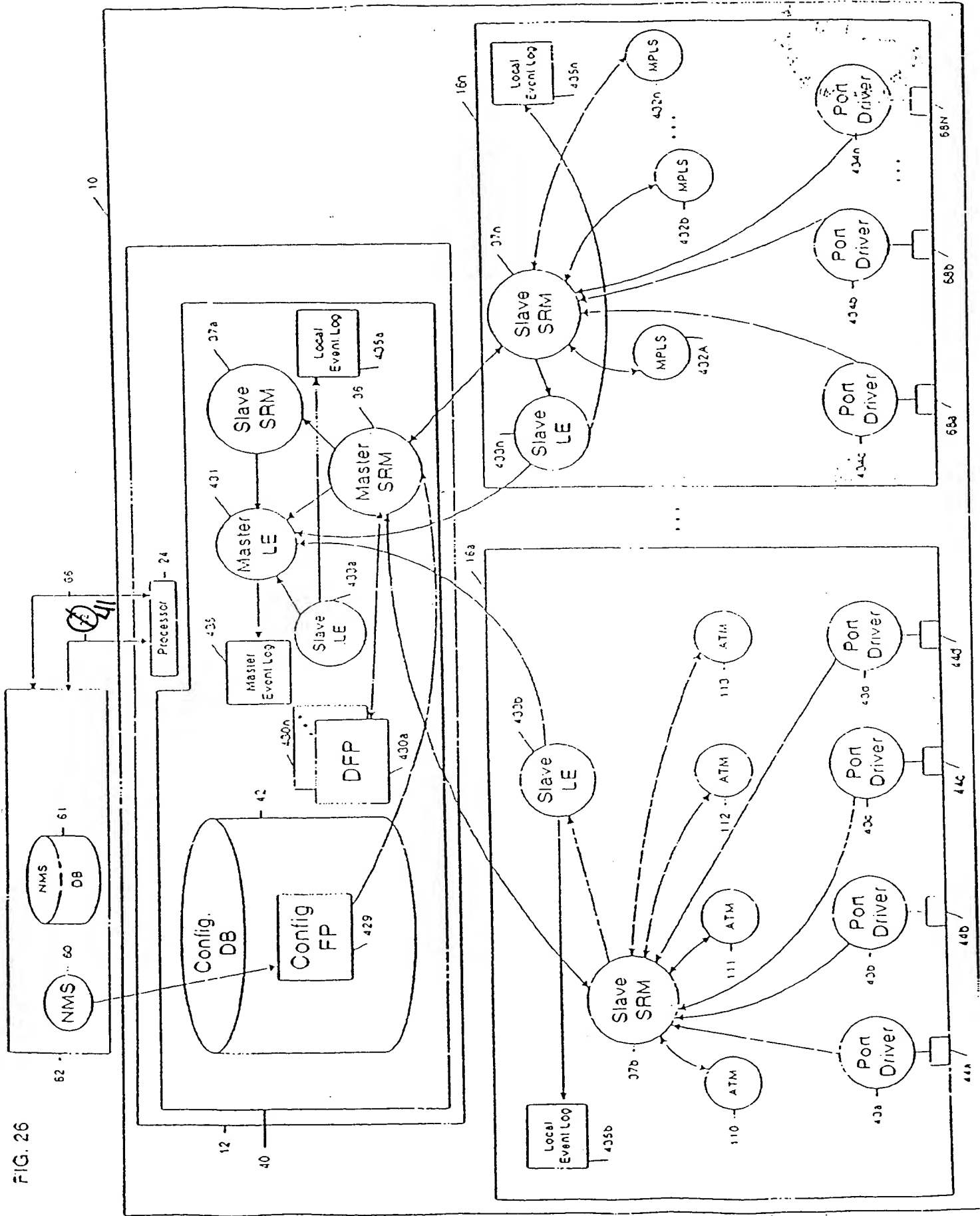
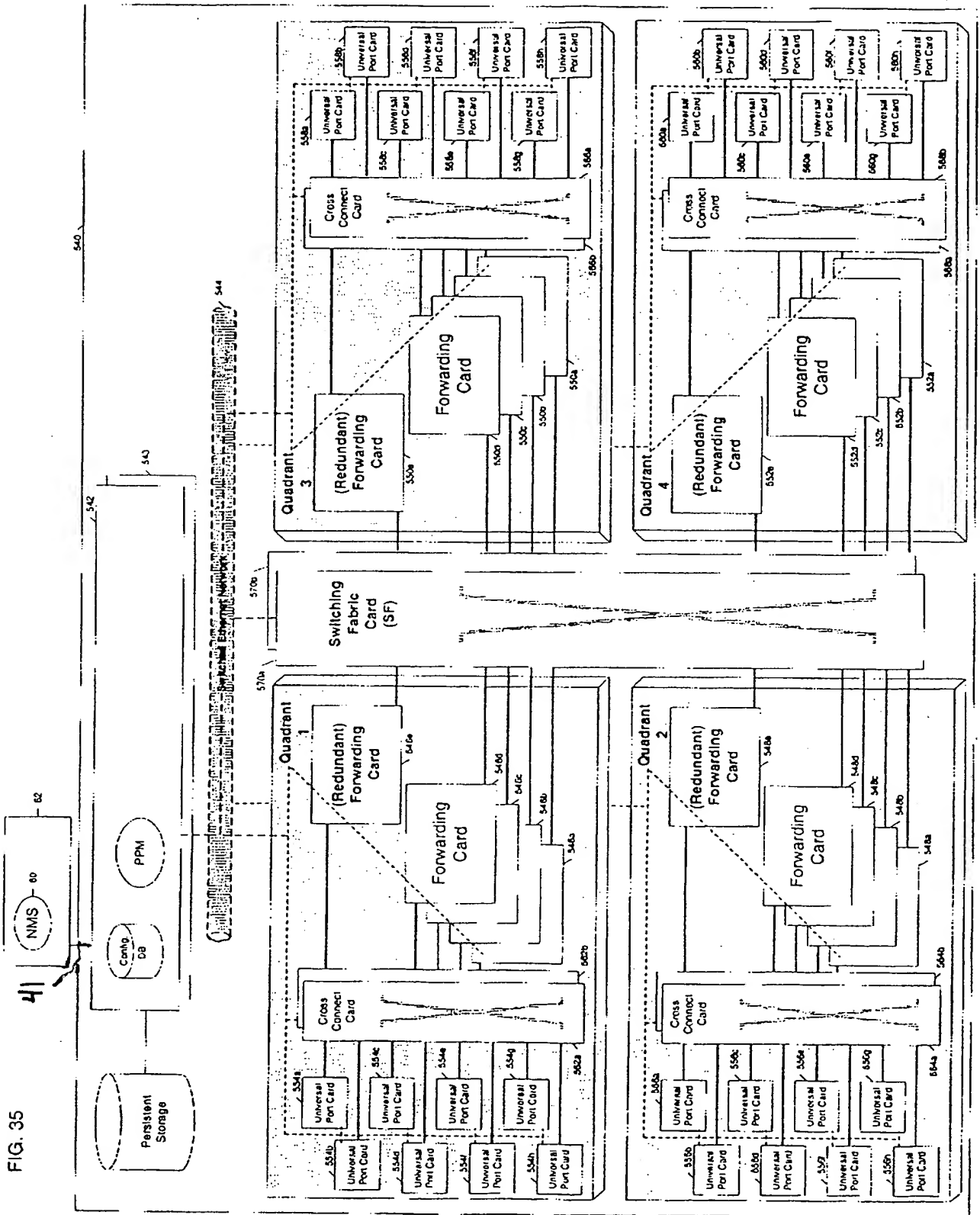
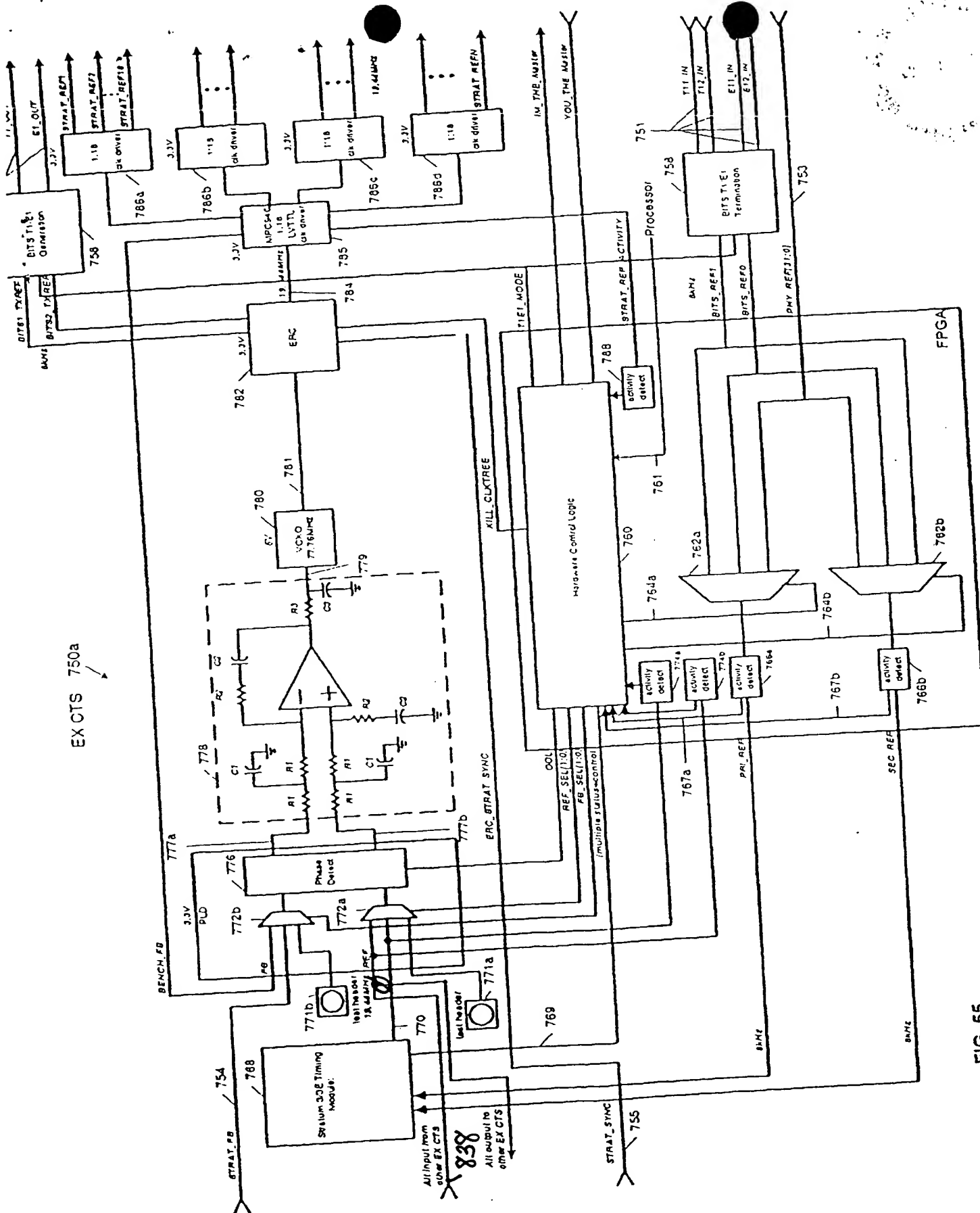


FIG. 35





**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☒ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**